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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:
Michael R. McGovern et al.

INTRAORAL RADIOGRAPHIC
DENTAL X-RAY PACKETS HAVING
NON-LEAD RADIATION SHIELDING

Serial No. 10/734,861

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Examiner: Hoon K. Song

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APPEAL BRIEF PURSUANT TO 37 C.F.R. 41.37 and 35 U.S.C. 134

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APPELLANT'S BRIEF ON APPEAL

Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of Claims 1-11 which was contained in the Final Official Action mailed January 24, 2006. A timely Notice of Appeal was filed on April 21, 2006.

Real Party In Interest

The Eastman Kodak Company is the real party in interest.

Related Appeals And Interferences

No appeals or interferences are known which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

Status Of The Claims

Claims 1-11 have been rejected.

Claims 1-11 are the appealed claims.

Appendix I provides a clean, double-spaced copy of the claims on appeal.

Claims 1-6 were originally filed with the application on December 12, 2003.

An Official Action rejecting Claims 1-6 was mailed on December 28, 2004. Appellants filed an Amendment in response to the Official Action on February 16, 2005, amending Claim 1 and adding new Claims 7-11.

A Final Official Action was mailed on May 19, 2005, rendering the rejection of Claims 1-11 final. In response to the Final Official Action, Appellants filed a Request for Continued Examination (RCE) on November 14, 2005 and a Response requesting reconsideration of the pending claims.

Another Final Official Action was mailed on January 24, 2006, rendering the rejection of Claims 1-11 final.

Appellants filed a Notice of Appeal on April 21, 2006.

Claims 1-11 remain pending, and are the subject of this appeal.

Status Of Amendments

Other than the Notice of Appeal and this Brief, no response has been filed since the Final Official Action dated January 24, 2006.

Summary Of The Invention

Intraoral radiographic x-ray film packets, also generally referred to as intraoral radiographic film packets or dental x-ray packets, have been employed in dental offices to capture x-rays of a patient's teeth and gums.

It is known in the art that heavy metals provide a shielding effect against various forms of radiation. Their effectiveness is associated with the size of their atomic nucleus or as is commonly referred in the art, their absorption cross-section. An effective heavy metal used to provide the shielding function in current medical and dental radiography is lead (atomic number 82). Yet, since certain heavy metals, like lead, are difficult to handle in certain applications and there is a perception that these heavy metals pose environmental issues, there exists an opportunity to not use lead for dental and medical radiographic applications.

The present invention provides a dental x-ray packet which does not employ lead for radiation shielding; has radiation shielding material which is sufficiently malleable/formable so as to be incorporated into a dental x-ray packet; provides for comfortable operation when used by a patient; and minimize the image effects of backscattered radiation.

As shown in Figure 1 and described in the Specification on Page 4, dental x-ray packet 10 includes an outer envelope comprising a first sheet 12 and a pair of overlapping sheets 14 on the opposite face thereof. Contained within sheets 12 and 14 is a paper wrapped element 16, a film chip 18, and radiation shielding member 20. In the embodiment shown in Figure

1, sheets 12 and 14 project beyond dimensions of paper wrap element 16, film chip 18, and radiation shielding member 20 to yield a laminated perimetric edge 22. Laminated perimetric edge 22 allows for heat sealing of sheets 12 and 14 to one another to yield a light tight perimeter to packet 10. A heat seal 24 can be generated at the overlap of sheets 14 to provide an outer envelope which is completely light-tight.

Radiation shielding member 20 is not comprised of lead. Rather radiation shielding member 20 is comprised of tin (atomic symbol Sn) sufficient to absorb backscattered radiation at oral x-ray energies from about 60 to about 80 kVp, where kVp stands for peak kilovoltage and represents the accelerating voltage of the x-ray generator and is a measure of the peak energy of the x-ray photon. Radiation-shielding member 20 is a metallic tin foil comprised of greater than 98 percent tin, preferably at least 99.95 percent tin, preferably about 99.975 percent tin. With such a configuration of tin, a pure tin foil of thickness 0.0024 +/- 0.0002 inches (i.e., about 0.0022 to about 0.0026 inches) would absorb at about the same amount of 60 kVp to about 80 kVp x-ray photons at a thickness of about 0.002 inches of lead.

Applicants have recognized advantages of using tin over any other non-lead metals. Applicants have recognized that tin foil provides an absorption cross section similar to that of lead at diagnostic x-ray energies, with similar manufacturing cost and processes. Accordingly, the dental packet based on tin foil would have approximately the same thickness as the current packet based on the lead foil, would have similar flexibility, and would have the same ability to absorb backscattered radiation.

Issues For Review By The Board

The following issue is presented for review by the Board of Patent Appeals and Interferences:

Whether Claims 1-11 are unpatentable under 35 USC 103(a) as being obvious over US Patent No. 4,912,740 (*Liese*) in view of US Patent No. 5,550,383 (*Haskell*).

Grouping Of Claims

The appealed claims are set forth in an attached appendix. For purposes of this appeal only:

Claims 1 and 5-8 should be grouped together, and will stand or fall as a single group.

Claims 2-3 and 9-10 should be grouped together, and will stand or fall as a single group.

Claims 4 and 11 should be grouped together, and will stand or fall as a single group.

Arguments

Issue:

Whether Claims 1-11 are unpatentable under 35 USC 103 as being obvious over US Patent No. 4,912,740 (*Liese*) in view of US Patent No. 5,550,383 (*Haskell*).

Claims 1-11 stand rejected under 35 USC 103(a) as being unpatentable over US Patent No. 4,912,740 (*Liese*) in view of US Patent No. 5,550,383 (*Haskell*). As best understood, the Examiner's position is that *Liese* "fails to teach that the metal sheet is non-lead and substantially Tin" and that *Haskell* "teaches an intra oral used of Tin material as a shielding", and therefore it "would have been obvious to adapt the metal sheet of *Liese* with Tin material as taught by *Haskell*, since the Tin material of *Haskell* would provide the necessary protection to healthy tissue during radiation exposure while avoiding

the toxicity of material such as lead" (Final Official Action dated January 24, 2006, Page 2). This rejection is respectfully traversed.

Even if, for argument purposes only, the cited references are combined as suggested by the Examiner, the present invention as claimed in independent Claims 1 and 7 would not result.

Haskell relates to a radiation shield for use during radiation therapy. During radiation therapy, very high doses of radiation are directed toward cancerous tissue. As such, the surrounding healthy tissue needs to be protected from these high doses. This is the focus of *Haskell* - *Haskell* is directed to a healthy tissue shielding device for use during radiation therapy. That is, *Haskell's* device is intended for protecting healthy tissue during radiation therapy such that the healthy tissue is not exposed to radiation. Thus, *Haskell* is a radiation protection tool.

In contrast, the intraoral film packet of the present invention is used for capturing an x-ray of the intraoral area of interest. More particularly, with the intraoral x-ray film packet of the present invention, the intraoral area of interest is exposed to radiation so as to capture an x-ray image. The shielding sheet of the intraoral film packet is employed to reduce scattered radiation, i.e., to filter scattered radiation so as to obtain an enhanced image of the intraoral area of interest. Thus, if *Haskell's* device was employed with the intraoral x-ray film packet of the present invention, then no x-ray image would be obtained since the intraoral area of interest would be shielded/protected from exposure.

Further, *Haskell* does not teach a sheet comprised substantially of tin. Rather, *Haskell* teaches a mold made from metal particles dispersed in a thermoplastic matrix material. Refer to *Haskell's* Col 5, lines 63-67 which states that the invention:

"involves directly manually molding a metal-filled thermoplastic compound of specific manufactured radioresistance while in a plastic flow state, which become a solid after cooling to human body temperatures".

As such, *Haskell* does not teach a sheet, nor does *Haskell* teach a sheet comprised substantially of tin.

The present invention's sheet provides for a homogenous material for uniformly reducing scattered radiation. In contrast, *Haskell's* metal/plastic mold is non-uniform. If *Haskell's* metal/plastic mold is employed as suggested by the Examiner, the intraoral packet of the present invention may be inoperative since the metal/plastic material could cause more scattered radiation which could be detrimental to the x-ray image quality.

For the reasons set forth above, independent Claims 1 and 7 are believed to be patentable over the cited references.

Claims 2-6 and 8-11 are dependent on Claims 1 or 7, and therefore includes all the features thereof. For the reasons set forth above with regard to Claims 1 and 7, Claims 2-6 and 8-11 are also believed to be patentable.

In addition, with specific regard to Claims 2-3 and 9-10, neither of the cited references make obvious at least 99.95 percent tin for the sheet since *Liese* does not teach tin and *Haskell* does not teach a mold comprised substantially of one material. Thus, even if combined, the present invention would not result.

As to Claims 4 and 11, the claimed thicknesses would not be obvious since the employment of tin for *Haskell's* purpose of protecting healthy tissue would require much larger thicknesses because of the high radiation doses applied during radiation therapy.

Summary

For the reasons stated above, Claims 1-11 are patentable under 35 USC 103 over US Patent No. 4,912,740 (*Liese*) in view of US Patent No. 5,550,383 (*Haskell*).

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Conclusion

For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the final rejection of Claims 1-11, and pass the application to issuance.

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Enclosures

Respectfully submitted,



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Appendix I

Claims on Appeal

1. An intraoral x-ray film packet, comprising:
an intraoral outer envelope;
a film chip disposed within the outer envelope; and
a non-lead shielding sheet disposed within the intraoral outer envelope, the non-lead sheet being comprised substantially of tin.
2. The intraoral x-ray film packet according to Claim 1, wherein the non-lead sheet is comprised of at least 99.95 percent tin.
3. The intraoral x-ray film packet according to Claim 1, wherein the non-lead sheet is comprised of about 99.975 percent tin.
4. The intraoral x-ray film packet according to Claim 1, wherein the non-lead sheet is a tin foil having a thickness of about 0.002 to about 0.0024 inches.
5. The intraoral x-ray film packet according to Claim 1, wherein the non-lead sheet absorbs between about 60 kVp to about 80 kVp of radiation energy.

6. The intraoral x-ray film packet according to Claim 1, wherein the outer envelope includes a laminated perimetric edge.

7. An intraoral x-ray film packet adapted to capture an intraoral image when exposed to a source of radiation, comprising:
an intraoral outer envelope;
a film chip disposed within the intraoral outer envelope; and
a non-lead shielding sheet disposed within the intraoral outer envelope adapted to absorb backscatter radiation when exposed to a source of radiation, the non-lead sheet being comprised substantially of tin.

8. The intraoral x-ray film packet according to Claim 7, wherein the non-lead sheet is disposed on one side of the film chip such that, when the film chip is exposed to a source of radiation to capture the intraoral image, the film chip is intermediate the source of radiation and non-lead shielding sheet.

9. The intraoral x-ray film packet according to Claim 7, wherein the non-lead sheet is comprised of at least 99.95 percent tin.

10. The intraoral x-ray film packet according to Claim 7, wherein the non-lead sheet is comprised of about 99.975 percent tin.

11. The intraoral x-ray film packet according to Claim 7,
wherein the non-lead sheet is a tin foil having a thickness of about 0.002 to about
0.0024 inches.

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Appendix II

Evidence

None

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Appendix III

Related Proceedings

None